LOAN DOCUMENT

DTIC ACCESSION NUMBER

LEVEL

INVENTORY

_____

DOCUMENT IDENTIFICATION

DISTRIBUTION STATEMENT

H A N D L E   W I T H   C A R E

ACCESSION FOR
NTIS   GRA&I
DTIC   TRAC
UNANNOUNCED
JUSTIFICATION

BY
DISTRIBUTION/
AVAILABILITY CODES

DISTRIBUTION	AVAILABILITY AND/OR SPECIAL
A-1	

DISTRIBUTION STAMP

DATE ACCESSIONED

DATE RETURNED

19981223 065

DATE RECEIVED IN DTIC

REGISTERED OR CERTIFIED NUMBER

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC

DTIC FORM 70A
JUN 90

DOCUMENT PROCESSING SHEET

PREVIOUS EDITIONS MAY BE USED UNTIL
STOCK IS EXHAUSTED.

LOAN DOCUMENT

NO DISTRIBUTION
STATEMENT

NADC
Tech. Info.

APPENDIX 3
COMPUTER PROGRAM OPERATORS MANUAL (CPOM)
FINAL SOFTWARE REPORT
DATA ITEM NO. A005

INTEGRATED ELECTRONIC WARFARE SYSTEM
ADVANCED DEVELOPMENT MODEL (ADM)

78009874

PREPARED FOR:

NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

CONTRACT N62269-75-C-0070

RAYTHEON
ELECTROMAGNETIC
SYSTEMS DIVISION

1 OCTOBER 1977

APPENDIX 3

COMPUTER PROGRAM OPERATORS MANUAL
FINAL SOFTWARE REPORT
DATA ITEM A005

INTEGRATED ELECTRONIC WARFARE SYSTEM (IEWS)
ADVANCED DEVELOPMENT MODEL (ADM)

Contract No. N62269-75-C-0070

Prepared for:

Naval Air Development Center
Warminister, Pennsylvania

Prepared by:

RAYTHEON COMPANY
Electromagnetic Systems Division
6380 Hollister Avenue
Goleta, California 93017

1 OCTOBER 1977

TYPE OF SPEC

Computer Program Operators Manual

TITLE OF SPEC

IEWS System Controller Program

FUNCTION	APPROVED	DATE	FUNCTION	APPROVED	DATE
WRITER	D. Bailey	9/1/77			

REVISIONS

CHK	DESCRIPTION	REV	CHK	DESCRIPTION	REV

REVISION																					
SHEET NO.																					
REV STATUS OF SHEETS	REVISION																				
	SHEET NO.																				

TABLE OF CONTENTS

SECTION I
SCOPE

1.1   Introduction

(U)   This document contains the Computer Program Operator's Manual (CPOM) for the Integrated Electronic Warfare System (IEWS). The IEWS is described in terms of the necessary hardware, software, and operator tasks and procedures required to exercise the system.

1.2   Functional Summary

(U)   This document provides the necessary information to load, operate, monitor, and restart the operational system.

1.2.1   Loading

(U)   Loading establishes the power up procedures and the transfer of operational software to the System Controller. See Table 2.

1.2.2   Operation

(U)   Operation provides the necessary operator command definitions and procedures for the system control and display units. See Table 4.

1.2.3   Monitor

(U)   Monitor provides the available methods to examine the system operation via the special test equipment. See Table 8.

1.2.4   Restart

(U)   Restart enables the operator to restart the IEWS operational system if a failure occurs.

SECTION II
OPERATIONAL ENVIRONMENT

(U)   This section defines the necessary equipment and computer programs required to operate the Integrated Electronic Warfare System (IEWS). It also identifies the documentation available to further develop specific operations, procedures, and installations.

2.1   Equipment Requirements

(U)   The IEWS comprises a number of units which are integrated to form an advmaced electronic warfare system. These units include receivers that detect, and encode in a digital format, all pulse signals within the operating frequency range. The encoded information is processed digitally to separate the signals into groups corresponding to individual emitters in the environment. Each emitter shall be identified and analyzed to determine the level of threat it poses to the aircraft. Defensive countermeasures shall be initiated against all emitters which are identified as threats.

2.1.1   Peripheral Equipment Identification

(U)   When configured in the operational state, the SC interfaces with the following units:

    1) Multibeam Receiver, *
    2) Heterodyne Receiver, *
    3) Instantaneous frequency measurement receiver, *
    4) Parameter Encoder,
    5) Signal Sorter,
    6) Emitter Tracker,
    7) Technique Generator,

8) Display and Control,

9) Program tape cassette, *

10) Instrumentation Tape, *

11) External Device 1 (HARM), *

12) External Device 2 (ALE-39), *

13) External Device 3 (MAWS), and *

14) External Device 4 (EO). *

(U)   When configured for maintenance, the SC also interfaces with
the following maintenance control panels and special test equipment (STE):

1) Response CPU Maintenance Control Panel,

2) Classification CPU Maintenance Control Panel,

3) Analysis CPU Maintenance Control Panel, and

4) STE

(U)   The following support peripheral equipments can be accessed
through the STE interface:

1) CRT

2) Line Printer

3) Floppy Disk

4) Paper Tape Reader

5) Paper Tape Punch

(U)   A block diagram of the operationally configured IEWS is shown
in figure 1. The primary data functional flow between the various units
is separated from the command and control path. Data flow in general proceeds
along two paths. The first consists of a flow from the receiver through
the parameter encoder and the signal sorter to the system controller for
analysis and response assessment. The second proceeds from the receiver
and parameter encoder and signal sorter to the emitter tracker, techniques

*Growth Capability

generator, and multibeam transmitter to generate an active countermeasure response. The command and control extends from the SC to all indicated units. The system operation is normally automatic; however, the operator can exercise certain override functions through the display and control unit to the system controller.

2.1.3 Computer Interface Block Diagram

(U) The computer interface block diagram is shown in figure 2. The diagram shows all SC/equipment interfaces in IEWS. Three parallel bus systems operate between the SC and other equipment. They are:

    1) Classification bus,

    2) Auxiliary bus, and

    3) Resource Management bus.

The classification bus handles message traffic between the SC and the SS. The auxiliary bus distributes PDWs throughout the system. The resource management bus interfaces to many of the other units in the system. Low data rate interfaces comprise six serial data busses. The address allocation to each unit or processor in the system is shown in figure 2.

2.2 Computer Program Materials

(U) The computer programs required for IEWS operation and maintenance are divided into 4 areas.

    1) System Controller (SC)

    2) Signal Sorter (SS)

    3) Techniques Generator (TG)

    4) Special Test Equipment (STE)

Each group of available software consists of a floppy disk file and associated backup paper tapes. The software used for initial loading, the STE operating system and linking loader, are not loadable by the floppy disk and exist only as paper tape. The list of available software is contained in table 1.

TECH HDWR

0000-0FFF

Shared MEM

C000-CFFF

TECH GEN

TECH PROC

7000-7FFF

STE

Shared MEM

5000-5PFF

Shared MEM

5000-5FFF

7000-7FFF

0000-4FFF

0000-4FFF

Shared MEM

STE HDWR

STE PROC 2

STE PROC 1

ANAL PROC

Resource Management Bus

MAWS *

F500-F5FF

MEM

2000-3FFF

FCC0-FCFF

AB1

C000-C3FF

1K BUF MEM

Auxiliary Bus

Analysis Bus

PE/ET

F200-F207

9000-AFFF

MEM

TRK CORR FIFO

AN/ALE-30 *

FC0C-FC0F

Disp/Contr

F000-F1FF

5000-5FFF

Shared MEM

0000-0FFF

1000-1FFF

Shared MEM

4000-4FFF

4000-4FFF

Shared MEM

0000-0FFF

Electro-optical *

FC08-FC0B

2000-2FFF

MEM

Class Bus

MEM

5000-6FFF

Shared Memory

0000-3FFF

1000-1FFF

PAR/Serial Conv

1000-4FFF

Shared MEM

0000-3FFF

Shared Memory

1000-2FFF

HARM *

FC04-FC07

FC00-FC03

RES MNGMT PROC

System Controller

PAR/Serial Conv.

FC00-FC03

C000-C7FF

Signal Sorter

SS SUPVSR

NEW EMIT PROC

MultiBeam Receiver

MultiBeam Transmitter

Heterodyne Receiver *

FC04-FC07

IFMR

CLASS PROC

C000-C7FF
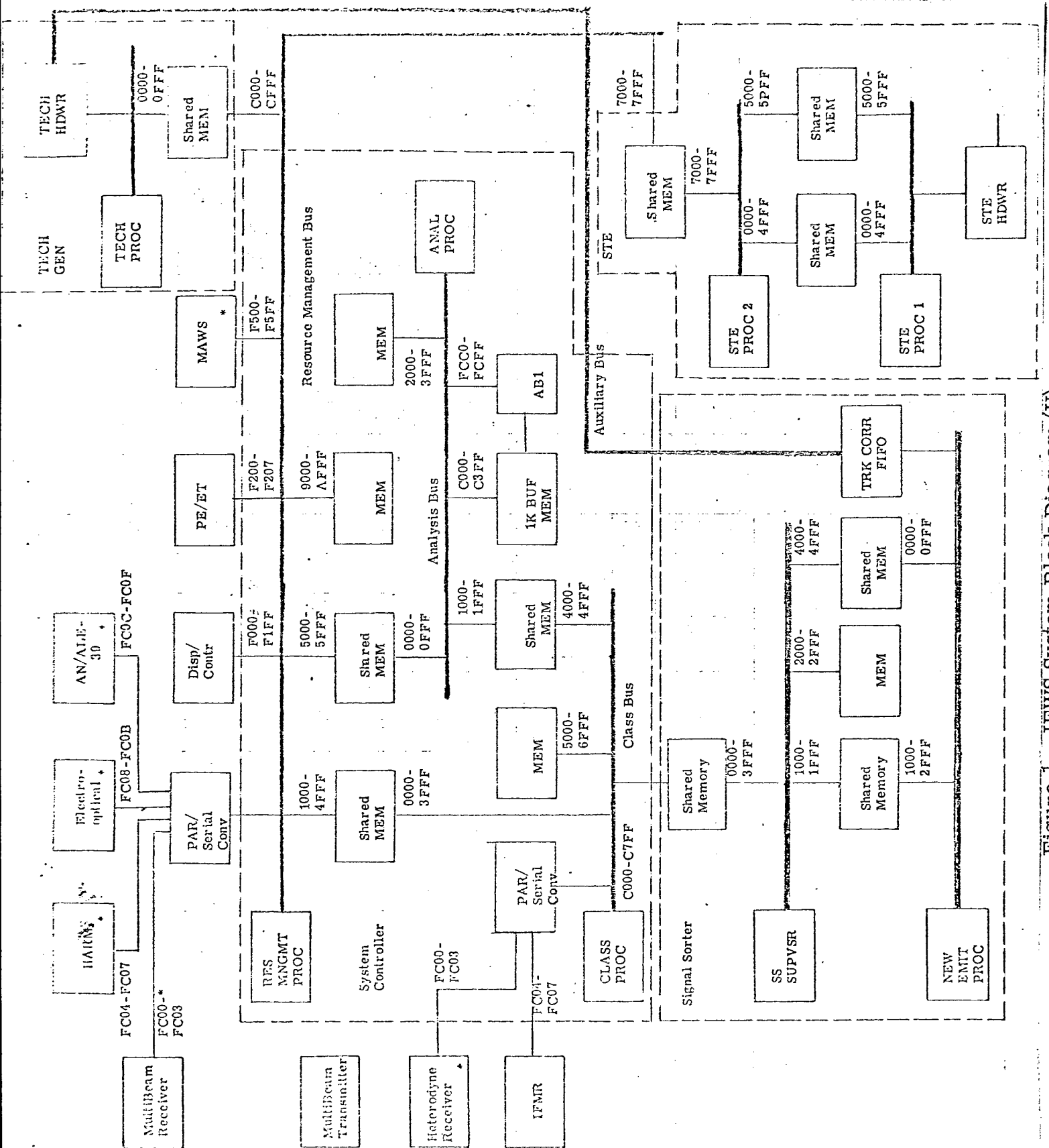
Figure 1. IEWS System Block Diagram (U)

TABLE 1

COMPUTER PROGRAM MATERIAL

UNIT	FUNCTION	PAPER TAPE	FLOPPY DISK	LISTING
SC	RMP Operation	RMPEX. BB DCDR. BB RMEXTS. BB RMPDE. BB	RMP. FD	RMP. LS
	RMP Loader	RMPLD. BB	RMPLD. FD	RMPLD. LS
	RMP XFER	XFRMP. BB	XFRMP. FD	XFRMP. LS
	CP Operation	CPEX. BB ARFG. BB ECFG. BB CPBE. BB	CP. FD	CP. LS
	CP Loader	CPLD. BB	CPLD. BB	CPLD. LS
	CP XFER	XFCP. BB	XFCP. FD	XFCP. LS
	AP Operation	APEX. BB APEX. BB	AP. FD	AP. LS
	AP Loader	APLD. BB	APLD. FD	APLD. LS
	AP XFER	XFAP. BB	XFAP. FD	XFAP. LS

TABLE I (Continued)

COMPUTER PROGRAM MATERIAL

UNIT	FUNCTION	PAPER TAPE	FLOPPY DISK	LISTING
SS	SS Operation		SUPV. FD NESU. FD	
	SS Loader	SSLD. BB	SSLD. FD	SSLD. LS
	SS XFER	XFSS. BB	XFSS. FD	XFSS. LS
TG	TG Operation	TGOP.BQ	1 TGOP. FD	TGOP. LS
	TG XFER	XTG. BB	STG. FD	XTG. LS
STE	Operating System	FDOS. BQ		FDOS. LS
	Linking Loader	LLDR. BQ		LLDR. LS
	Data Recording	DRCD. BW	DRCD. FD	DRCD. LS
	Data Reduction	DRDR. BQ	DRDR. FD	DRDR. LS
	SC Loader	SCLT1. BQ	SCLT1. FD	SCLT1. LS
	STE Loader	STELT. BB	STELT. FD	STELT. LS

2.3   Supporting Documentation

(U)   The information available for each unit consists of hardware and software specifications. Additional information is available in the form of operation manuals.

2.3.1   System Controller

System Controller Software Functional Requirements

061290529

Computer Program Performance Specification for System Controller Unit, IEWS, ADM

93959-GT-0301

System Controller Unit Hardware Development Specification (ADM) IEWS

53959-GT-0750

System Controller Program Design Specification (ADM) IEWS

53959-JK-1002

System Controller - Sorter Interface Control Document

9211/RA/IEWS #292
9211/RA/IEWS #303
9211/RMB/IEWS #468

Display/Control Manual Switch Operation Task Requirements

Computer Subprogram Design Document, Executive, IEWS

Computer Subprogram Design Document ,
Sorter Message Processing, IEWS

Computer Subprogram Design Document,
Analysis Return Processing, IEWS

Computer Subprogram Design Document,
Emitter Classification Processing 1, IEWS

Computer Subprogram Design Document,
CW Processing, IEWS

Computer Subprogram Design Document,
ABI Management, IEWS

Computer Subprogram Design Document,
Resource Management, IEWS

Computer Subprogram Design Document,
Display/Control, IEWS

Computer Subprogram Design Document,
System Management 2, IEWS

Common Data Base Design Document,
IEWS

Data Extraction Design Document

2.3.2	Signal Sorter	
(U)	ESD-SB-001	Signal Sorter, IEWS, Equipment Design and Performance Specification
	CG-893645	IEWS Signal Sorter, Computer Program Performance Specification
	53959-JK-1002	System Controller - Sorter Interface Control Document
2.3.3	Technique Generator	
(U)		Technique Generator, Computer Program Performance Specification
	53959-HM-0410	Technique Generator, Unit Hardware Development Specification
2.3.4	Special Test Equipment	
(U)	9211/DB/IEWS #517	Software Development Center Paper Tape Software System
	9211/DB/IEWS #566	Data Recording Operation Manual RP-16 Linking Loader RP-16 Relocatable Object Text

SECTION III

PRESTANDBY PROCEDURES

(U)   This section describes the operator tasks and procedures prior to normal system operation. It includes the power up and equipment setup, program loading, and program initialization. Table 2 contains a list of these necessary operator functions.

3.1   Equipment Setup

3.1.1   Power Up

(U)   The IEWS system power is routed via a central distribution box controlled by the POWER ON switch on the display and control panel. The Special Test Equipment must be powered up separately. This includes the main power switch on the front panel, the floppy disk power switch, the paper tape reader power switch, and the paper tape punch power switch.

3.1.2   Equipment Reset

(U)   The IEWS is master cleared prior to operation via the RESET switch on the system controller.

3.2   Program Loading

3.2.1   STE Operating System and Linking Loader

(U)   The floppy disk operating system (FDOS.BQ) and the linking loader (LLDR.BQ) are loaded via the RP-16 bootstrap loader. The bootstrap loader, located at "FF$\phi\phi_{16}$, requires starting and the typing of "H" then the stack address of "$\phi\phi\phi 1\phi\phi$" for each load.

3.2.2   STE/SC Loader

(U)   The SC loader (SCLT1.FD) must be moved into the STE processor one so that the additional loaders and data can be obtained. This loader is

available on a floppy disk and is loaded by starting the FDOS at "$4\phi_{16}$" and by placing the disk in the drive, assigning the file handler BIN1 to the loader file and by executing the "LO" load command.

3.2.3   STE and RMP Loaders

(U)   The SC loader is now used to load the various loaders. The first two are the STE processor 2 loader (STELT. FD) and the RMP loader (RMPLD. FD). This is accomplished by assigning the file handler BIN1 to the correct disk file and by executing the SC loader.

3.2.4   AP and CP Loaders

(U)   If the RMP and CP control panels are present, the AP and CP loaders, APLD. FD and CPLD. FD respectively, must be manually initiated by first starting the RMP at "$7\phi44_{16}$", then by assigning the file handler BIN1 to the correct disk file and by executing the SC loader. The CP is then started at "$2\phi4_{16}$".

3.2.5   SC Software

(U)   The SC software is loaded by assigning the disk file containing the SC software to the BIN 1 file handler and by starting the SC loader. The data is positioned automatically to the correct memory via the various loaders.

3.2.6   Data Recording

(U)   To load the data recording software in the STE, assign the Linking Loader to the disk file containing the DATA RECORD (DRCD. FD) and start the linking loader via the "LO" command.

3.2.7   Data Reduction

(U)   After the test is performed and data has been recorded on a disk file the data reduction software should be loaded. Halt the STE then reload the Linking Loader LLDR. BQ (see 3.2.1). Assign the

BIN 1 file holder to the disk file containing the DATA REDUCTION (DRDR. FD) and start the loader via the "LO" command.

Table 2. Prestandby Procedures (U)

1) Depress D/C Power On (3.1.1)

2) STE Power On (3.1.1)

       Main Power

       Floppy Disk

       Paper Tape Reader

       Paper Tape Punch

3) Depress SC Reset (3.1.2)

4) Load FDOS. BQ in PTR (3.2.1)

5) Start STE @ "$FF\emptyset\emptyset_{16}$" Observe "?" (3.2.1)

   Type "H" Observe "??"

   Type "$\emptyset\emptyset\emptyset1\emptyset\emptyset$" Tape loads half "$FF58_{16}$"

6) Load LLDR. BQ in PTR (3.2.1) Repeat (5)

7) Start STE @ "$4\emptyset$"$_{16}$ Observe "Operating System" Place SCLT1. FD in Disk Drive A (3.2.2) Type "As BIN 1, FDA, $\emptyset$

   Type LO   Files load Observe "Busy"

8) Place SC. FD in Disk Drive B Type "As BIN 1, FDB, $\emptyset$" (3.2.3)

   "Go TBD" Files Load Observe "Busy"

9) Start RMP @ "$7\emptyset4\emptyset_{16}$" Type "As BIN 1, FDA, 1" (3.2.4) "CO

   TBD" Files load observe "Busy"

   Start cp @ "$2\emptyset4_{16}$"

10) Type "As BIN 1, FDA, 2" (3.25) "Go TBD" Files load observe "Busy"

11) Type "As BIN 1, FDB, 1" (3.2.6)

   'LO' Files load observe "Busy"

12) Master Clear STE (3.2.7)

   Start @ "$FF\emptyset\emptyset_{16}$" observe "?" Load LLDR. BQ in PTR (3.2.1)

   Type "H" Observe "??" Type "$\emptyset\emptyset\emptyset1\emptyset\emptyset$" Tape Loads Hait "$FF58_{16}$"

   Start @ "$4\emptyset$" Observe "Operating System" "As BIN 1, FDB, 2"

   "LO"   Files load observe 'Busy"

3.3   Program Adaption

(U)   All the computer programs associated with IEWS are
selfinitializing and require no operator inputs prior to operation.

SECTION IV

STANDBY/OPERATE PROCEDURES

(U)　　　　This section describes the operator tasks and procedures required for normal system operation. It includes the Special Test Equipment and IEWS Display/Control commands.

4.1　　　　Special Test Equipment

4.1.1　　　I/O Device Assignment

(U)　　　　The STE outputs must be assigned to the appropriate devices prior to program operation. The STE outputs are as follows:

　　　1)　BIN2　=　Raw Data Output
　　　2)　BIN1　=　ASCII Record Output
　　　3)　LST1　=　ASCII Print Output

The available I/O devices are as follows:

　　　1)　TYP　=　Operator Console
　　　2)　FDA　=　Floppy Disk Drive A
　　　3)　FDB　=　Floppy Disk Drive B
　　　4)　PTP　=　Paper Tape Punch
　　　5)　PTR　=　Paper Tape Reader
　　　6)　SLO　=　Serial Line Output
　　　7)　SLO1　=　Operator Console (no LFCR)
　　　8)　SLI　=　Serial Line Input
　　　9)　NOP　=　Nothing

4.1.2　　　Data Recording Operation

(U)　　　　The starting address of DATA RECORDING is "1000_{16}". Initiating a "GO" command causes the STE to start processing messages and display them to the operator. Additional commands are available for

message control (see table 3) such as "SF 1" which will record all the incoming message via BIN2. The operation is terminated by the "QU" quit command and the recorded data file is closed via the "EF" command.

TABLE 3
DATA RECORDING COMMANDS

A. Primary Commands

Go Initializes and Starts Processor 2

In Initializes Processor 1

Qu Stops Processor 2 and Returns Control to Operating System

B. Review Mode

RV Rewinds BIN 2 and Loads Input Cyclic Buffer

C. Message Control

*** Default All Messages Sent to Display ***

SF< SW1 > , < SW2 > , < SW3 > if SW1=1 RAW Data to BIN 2
                        if SW2=1 ASC II Data to I. LST1
                        if SW3=1 ASC II Data to I. BIN1

DS < OP CODE > , < FILE , < COUNT > DISPLAY (I, OPLS)

PR < OP CODE > , < FILE , < COUNT > PRINT (I, LST1)

RD < OP CODE > , < FILE , < COUNT > RECORD (I, BIN 1)

AF < OP CODE > , < SWITCH >   ALL FILES ON =1, OFF=0

EXAMPLES:

DS 80, 1, 1 - Display Data Extraction Point MSG 80 For Track
            File 1 Every Time

PR 81, 2, 10 - Print MSG 81 For File 2 Every 10TH Time

RD 81, 3, 100 - Record MSG 81 For File 3 Every 100TH Time

AF 81, 1 - Print And Record Every MSG 81

D. SC Messages

DM PROC # , ADDRESS Dump 15 Contigous Memory Locations

MO PROC # , ADDRESS , ARG1 ,,,,, ARG8 Modify Up To 8 Memory Locations

EM ARG , ARG ,,,,, ARG CREATE ANY SC MESSAGE (Processor Numbers: 3=RMP, 4=AP, 5=TG, 6=CP, 7=SS)

E. INS Control

HEAD   ALT   PITCH   ROLL

IL From, To, Inc, From, To, Inc, From, To, Inc, From, To, Inc. (In (LSB = 1°/SEC or 10 FT/SEC)

4.1.3 Data Review

(U) To review the RAW DATA file the SC/RMP must be halted so as not to interfere. The Data Recording program must be restarted and the review mode (RV) entered. Processing is identical to normal operation.

4.1.4 INS Simulation

(U) To simulate changes in aircraft heading the start and stop limits and the rate of change must be entered via the "IL" command.

TABLE 4. STE OPERATION

1) Start STE @ "40_{16}" Observe "operating system"
   Insert raw data floppy disk in drive A
   Under write protect switch Observe "ready" wp off

   Insert record data floppy disk in drive B
   Under write protect switch Observe "ready" wp off

   Type "as BIN2, FDS" (4.1.1)
   Type "as BIN1, FDB"
   Type "as LST1, SLO"

2) Type "go 1000" (4.1.2) Observe "data extraction"
   Type "SF 1"
   Type "GO"

      ** Data received from SC is displayed and stored **

   Type "QU" Observe "operating system"
   Type "EF BIN2" Observe "file closed"

3) Halt RMP
   Type "go 1000" (4.1.3) Observe "data extraction"
   Type "RV"
   Type "GO"

      ** Data received from stored file and displayed **

   Type "QU"

4) Type "IL 0, FF, 10" (4.1.4) Observe "target movement 0-256° at 1°/sec"

4.2   IEWS Operation

4.2.1   Starting

(U)   Each processor must be started via the associated control
panels. The RMP starts at "$9\emptyset 8E_{16}$" the cp at "$5\emptyset\emptyset 2_{16}$". IEWS is now
processing received data.

4.2.2   Transmit

(U)   To provide high voltage to the transmitter TWT's the transmit
switch must be enabled on the D/C panel.

4.2.3   Display Priority

(U)   To select the highest 8 priority emitters for the polar display,
the priority/all switch must be enabled on the D/C panel.

4.2.4   Emitter Parameters

(U)   To obtain detailed emitter paramters on the alphanumeric display,
the cursor must be positioned to the selected emitter and the emitter hooked.
The parameters will continue to be displayed and updated.

4.2.5   Expand Display

(U)   To resolve a multiple emitter symbol on the polar display,
the cursor must be positioned to the multiple emitter symbol and the expand
mode enabled. The highest priority emitter within the resolved group becomes
hooked.

4.2.6   List Display

(U)   To display a list of 8 detected emitters in order of priority, the
keyboard must be used. The list mode is entered by typing "L" then the
desired priority level.

4.2.7   Acquire

(U)   To obtain detailed parameters on an emitter with a specific priority the keyboard must be used.   The acquisition mode is entered by typing "A" then the desired priority level.

4.2.8   Manual Priority

(U)   To modify the priority assigned to an emitter, the emitter is hooked and the new prioty is entered by typing "P" then the desired priority level.

4.2.9   Manual Technique

(U)   To modify the technique assigned to an emitter, the emitter is hooked and the new technique is entered by typing "T" then the desired technique number.

4.2.10   Return Technique And Priority

(U)   To return a modified technique and priority to SC contro, type "R" then the present priority level.

TABLE 5. SC OPERATION

1)   Depress Reset (4.2.1) Observe Processor Halt

Set RMP Switches to "$9\emptyset 8E_{16}$"

Load P-Reg

Execute Run

Set cp Switches to "$5\emptyset\emptyset 2_{16}$"

Load p.reg

Execute Run   Observe Detected Emitters

if desired

2)   Depress XMIT (4.2.2) Observe "XMIT Indicator"

3)   Depress Priority (4.2.3) Observe "Indicator"

4)   Position Cursor To Emitter Parameters

5)   Position Cursor to Multiple Emitter Symbol (4.2.5)

Depress Expand Observe Display Change

6)   Type "Lnnn" (4.2.6) Observe Emitter List nnn=priority level

7)   Type "Annn" (4.2.7) Observe Emitter Parameters nnn=priority level

8)   Type "pnnn" (4.2.8) Observe Changed Priority

nnn=priority level

9)   Type "Tnnn" (4.2.9) Observe Changed Technique nnn=technique

number

10)   Type "Rnnn" (4.2.10) Observe Changed Priority and Technique

nnn=Priority Level

SECTION V
MONITORING PROCEDURES

(U)   This section describes the operator tasks and procedures required
to monitor the IEWS system operation. Monitoring capabilities exist in
the Special Test Equipment and consists of memory read/write commands and
data extraction routines. The list of possible operations is found in Table 8.

5.1   Special Test Equipment

5.1.1   Memory Read

(U)   The STE allows the capability to interrogate all the memory
within the address spectrum of IEWS. By entering the "DM" command,
the processor number, and the starting address 15 contiguous memory
locations are returned as a data extraction message. The assigned
processor numbers are:

    3=RMP
    4=AP
    5=TG
    6=CP
    7=SS

5.1.2   Memory Write

(U)   The STE allows the capability to modify all the memory within the
address spectrum of IEWS, except a portion of the technique generator memory.
By entering the "MO" command, processor number, start address, and
up to 8 data words, contiguous memory locations are modified.

5.1.3   Data Extraction Monitoring

(U)   The STE allows the capability to handle certain data extraction
messages in various manors. In normal operation or while in review mode
(4.1.3) specific message may be displayed, printed, or recorded. The operator

can specify which message, which track number, and how many must be received prior to an output. The command "DS" selects the operator display, "PR" selects LST1 assignment (see 4.1.1), and "RD" selects BIN 1 assignment (see 4.1.1). By entering the command, data extraction opcode, track number, and count, various capabilities exist. If the track and count is not required, the "AF" command will enable all files for the specified opcode. See table 6 for SC Opcodes for the available opcode messages.

5.2 IEWS Data Extraction

(U)   Data extraction points peovide the monitoring of the SC operational software. Each data extraction point must be assembled or patched into the SC operational code. Whenever a DE point is encountered during execution a message is generated if the processor, opcode, and DE point is enabled. This message is sent to the STE for processing.

5.2.1 Data Extraction Points

(U)   A data extraction points may send the contents of the registers, 16 contiguous memory locations, or 16 non-continguous locations, See the data extraction design document for specific coding details.

5.2.2 Processor Enable

(U)   Each processor is initially enabled when it is loaded. If the processor is to be disabled a $\emptyset$ should be sent to "AC53$_{16}$" for the RMP, "6C53$_{16}$" for the CP, "3C5B$_{16}$" for the AP.

5.2.3 Opcode Enable

(U)   Each opcode must be enabled by the STE operator. If the opcode is to be enabled a non-$\emptyset$ should be sent to the appropriate location "AC53+1+opcode$_{16}$" for the RMP, "6C53+1+opcode$_{16}$" for the CP, "3C5B+1+opcode$_{16}$" for the AP.

TABLE 6. SC OPCODES

	SORTER		RMP		CP		AP	
0	80 PTDW	90 NPDW MESSAGE	A0	B0 WATCH DOG TIMER	C0	D0	E0	F0
1	81 NEW EMITTER ALERT	91 MEMORY DUMP	A1 UNEXPECTED INTERUPT	B1 SYSTEM TEST DRIVER	C1 UNEXPECTED INTERUPT	D1	E1 UNEXPECTED INTERUPT	F1
2	82 CAM FILE DUMP	92 MULTIFREQ FLAG	A2 NON-EXIST DRIVER	B2 PRIORITY DUMP	C2 NON-EXIST DRIVER	D2	E2 NON-EXIST DRIVER	F2
3	83 AOA READOUT	93 BIT STATUS	A3	B3 ID DUMP	C3	D3	E3	F3
4	84 THROTTLE ALERT	94 TG MEMORY DUMP	A4 MEMORY DUMP	B4	C4 MEMORY DUMP	D4	E4 MEMORY DUMP	F4
5	85 CONFIRM FILE CREATION	95	A5	B5	C5	D5	E5	F5
6	86 ERROR ALERT	96	A6	B6	C6	D6	E6	F6
7	87 INACTIVE FILE ALERT	97	A7	B7	C7	D7	E7	F7
8	88 LONG PULSE PARAMETERS	98	A8	B8	C8	D8	E8	F8
9	89 IB<1/4 FULL	99	A9	B9	C9	D9	E9	F9
A	8A IB>3/4 FULL	9A	AA	BA	CA	DA	EA	FA
B	8B FILES FULL	9B	AB	BB	CB	DB	EB	FB
C	8C TROTTLE FILES FULL	9C	AC	BC	CC	DC	EC	FC
D	8D BUS HUNG	9D	AD	BD	CD	DD	ED	FD
E	8E WATCH DOG TIMER	9E	AE	BE	CE	DE	EE	FE
F	8F ALR-50	9F	AF	BF	CF	DF	EF	FF

The opcode can be $\emptyset$ through FF_{16}. See table 6 SC opcodes for those presently implimented.

5.2.4 Extraction Point Enable

(U)   Each data extraction point must be enabled by the STE operator. If the DE point is to be enabled a non-$\emptyset$ must be sent to the appropriate location. These locations are contained in Table 7.

PROCESSOR	MESSAGE	ROUTINE	AREA
	Update	ANOC2	EDC Processing 2 (Part of Anal Return)
		ANOC4	EOC Processing 4
		SOOC1	EOC Processing 1
CP	Deletion	SODE L	Inact File Alert Processing (Part of SS MSG Processing)
	Acquisition	SONE 1	New Emitter Processing
	Response	AB1DR	ABI Management 1 Driver
	Class.	ANAMB	(Ambiguity Resolution Part of and/RTN)
RMP	Id Dump	RMARPR	Arrange Priorities (Res Mng)
	Priority Dump	RMARPR	Arrange Priorities (Res Mng)
CP	Sorter 80-93	SODR	SS Msg Proc Driver (Sorter Msg Processing)

Table 7. DE Points (U)

TABLE 8, MONITORING

1)   Type "DM p, ADDR" (5.1.1) observe memory dump message
       p=processor 3=RMP, 4=AP, 5=TG, 6=CP, 7=SS ADDR=Address

2)   Type "MO P, ADDR, DATA 1, DATA 2, ...DATA 8" (5.1.2)
       p=processor ADDR=Address

3)   Type "DS CODE, TRK, COUNT" (5.1.3)
            "PR CODE, TRK, COUNT"
            "RD CODE, TRK, COUNT"
            "AF CODE"

4)   Type "MO 3, AC53, $\emptyset$"   (5.2.2) Disable RMP
       Type "MO 6, 6C53, $\emptyset$"   Disable CP
       Type "MO 4, 3C5B, $\emptyset$"   Disable AP

5)   Type "MO 6, 6D2F, 1" (5.2.3) Enable Acquisition

SECTION VI
RECOVERY PROCEDURES

(U)   This section describes the operator tasks and procedures required to restart the IEWS system after an abnormal interruption.

6.1   STE Restart

(U)   The reinitialize the STE prior to SC restart the operator must enter an "IN" and a "GO" command.

6.2   SC Restart

(U)   If an SC processor is halted or becomes hung, the system must be reinitialized. This requires restarting the RMP at "$9\emptyset8E_{16}$" and the CP at "$5\emptyset\emptyset2_{16}$". If the system fails to restart, it must be reloaded (see section 3.)